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THE POTATO ASSOCIATION OF AMERICA

EAST LANSING, MICHIGAN

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Fertilizer and Subsoil Studies for Potatoes On Ten Iowa Peat and Muck Farms in 1931

C. L. FITCH, Ames, Iowa

This work was done with our help by leading farmers of Wright, Cerro Gordo, Hancock and Worth counties, in cooperation with the Mesquakie Mills of Cedar Rapids and in collaboration with Harry H. Gardner of the N. V. Potash Export My., Mason City, Iowa.

Final conclusions as to the needs of these soils for potatoes are reserved, but the choice of fertilizers, the amounts to be used and the size of crops and profit therefrom are matters of such vital importance to these farmers and taxpayers, to their neighbors and to the fertilizer companies that the data of 1931 are furnished, pending the securing of experience covering a longer time. All concerned should hold themselves ready to change their fertilizer practice should the fact later appear different in the average season from those of 1931.

Certified Irish Cobbler seed from Hoople, North Dakota, was used on all plots, and all were sprayed three times or more with bordo.

The year of 1931, in which these studies were made, was a very hot and a very dry season. Further studies of this nature are needed to include years of more moisture and cooler weather and other years of heat and drought, before we can be sure just what will be the most profitable practice for the different farms. The following, however, is far better information than none, and we recommend its application until more exact information can be secured. Constant studies of the kind through the years to come will be needed in order to have current practice more efficient, economical and profitable.

Each test was taken on 3-100 acre on each plot except as noted. With 3-foot rows, 435′ of one row is 3-100 acre.

Fertilizer Studies

It was made clear that 0-9-27 on these plots in 1931 was the best analysis, and that 500 pounds of it was more profitable than 1,000 pounds. Results suggest that peat beds fertilized for the first time might have more than 500 pounds. As to residues left from previous crops which were fertilized, it was clear that the browner and less alkali lands carry over the most fertilizer and need less each year than do the longer farmed blacker soils. Among the brown lands we would include the Traas, Haan and Kennedy plots. The Haan plots had 0-20-20 applied on top in 1930 for onions, which was the first fertilized crop, and here the carry-over was very heavy, and additional fertilizers did very little good for the crop of 1931. On the Traas and Kennedy plots, 0-8-32 was used in 1930 for potatoes, both being the first time fertilizer was used on these lands. Traas used about 500 pounds and Kennedy about 800. On these three plots, it seems probable that for a crop the size of the 1931 yield, 200 or 300 pounds of 0-9-27 in the row would have given just as big a crop as twice as much. In fact, by a mistake at Kennedy's on our yield test plots, we got yields of Cobblers averaging over 330 bushels of U. S. 1 size and quality with the addition of only 300 pounds to the acre of 0-20-20 fertilizer. Adding 3% nitrogen to the 0-9-27 made an extra cost of about $10 per ton and a loss of 25 bushels of potatoes per acre, average on the 10 farms.

The Brozik, Gealow and Rye plots were on muck that was darker, more solid and longer farmed. These plots needed a good amount of 0-9-27 and doubtless will need it every year. Our theory is that these blacker lands bring up more water from below and leave more alkali salts in the furrow slice, have less vegetable matter and need a constant supply of potash to tie up this alkali and to leave some available for the growth of the crop, and to balance the natural nitrogen and the applied phosphates.

At Hollandale there is a general belief that brown and even mossy peat is better for getting yields of potatoes than is older black muck. Growers at Hollandale and from there gradually have planned deeper to turn up into the furrow slice more of the flaky peat. In this work there are suggestions that the older, darker colored lands produce smaller yields of potatoes and that this is independent of disease or other factors dependent upon

rotation. The cause of this is not known. Studies should be pursued to determine if this be due to increased alkali, to removal of some unknown element of fertility, to lower root temperature or to what other cause, and remedies should be sought and found.

In the course of these studies, some way may be found to deal more cheaply with alkali than to use so much expensive potash.

Subsoil Studies

We carried a small shovel and subsoil auger all the season. At first the auger was five feet, later it was eight feet. We carried also a pocket thermometer of scientific accuracy all the season. We dug and bored at least two holes at each place to 8 feet deep, and many others.

Temperatures constantly were lower as one went down, until at 4 to 6 feet they were around 50 degrees F. in the hottest weather. Tuber bed temperatures above 85 degrees F., the point at which growth stops, were not found.

The Kennedy, Traas, Haan, Elthon and Kroeze plots were deep peaty muck over clay. The Brozik and Gealow plots were deep black muck over clay, Gealow's being the deepest soil of all. The Rye plot was rather shallow muck over clay and marly clay. The Moellering plot was shallow peaty muck over deep sandy blue clay to 8 feet. The McFarland plot was a clay loam such as at Hollandale is called "mineral," with mellow mucky top, shading down to tougher clay with "dry" impervious clay layer at 4 feet, which had water both beneath and above it the middle of October. Under none of the plots, was there loose sand found. Often fine sand was found mixed intimately with blue and other clays, making them not impervious even though retentive of moisture. The impervious clays did not grit in the teeth.

The McFarland plots had been well fertilized in previous years and additional fertilizers were of little or no use. This should be considered in connection with the impervious stratum beneath these plots and the location in the corner of two deep ditches, good drainage, and probable low alkalinity. This soil certainly has no more vegetable matter and is more solid than the Brozik and Gealow plots. Probably it has less evaporation from the surface.

It was clear also that the older, blacker soils underlaid with clay produced potatoes having less scab and of better shape. So far as one year can tell, we may look forward to better shape and less scab as these soils get older, provided they don't

have sand or marl beneath them too close up, to overdrain these lands, or make them too alkali.

Peat and muck seem to be cooled from below and insulated from above and have relatively cool tuber beds, especially if the leaves do a good job of shading. Scab control may yet be found largely a matter of low temperatures.

Yields of Potatoes With Different Fertilizers in 1931

Moellering Plots—

No fertilizer, average of 2 checks	90 bu.
500 pounds of 0-9-27 per acre	180 bu.

Elthon Plots—

No fertilizer, average of 2 checks	173 bu.
500 pounds 0-9-27	294 bu.

Rye Plots—

No fertilizer, average of 2 checks	69 bu.
500 pounds 0-9-36	160 bu.

Average of the Three—

No fertilizer	111 bu.
500 founds per acre	205 bu.

The Relative Need of Different Types of Peats and Mucks For Fertilizers

II. **Brozik and Gealow Plots Averaged.**—These are the deep, black mucks, probably highly alkaline, previously fertilized.

No fertilizer, average 2 checks each place	147 bu.
500 pounds 0-9-18	217 bu.
500 pounds 0-9-27	248 bu.

Kennedy, Traas and Haan Plots Averaged—These plots are deep, brown, peaty muck, fertilized before. Additional fertilizers did much less good than on the Brozik or Gealow plots. The residues carried over from 1930 did most of the work. Probably much less than 500 pounds of 0-9-27 would have given maximum yields in 1931.

No fertilizer, ave. of 2 checks at each plot	250 bu.
500 pounds 0-9-18 per acre	252 bu.
500 pounds 0-9-27 per acre	279 bu.

III. **The McFarland Plot** shows that on well drained "mineral" land, with strong subsoil, mellow top, impervious layer at 4 feet, fair vegetable matter content, and very little alkali, previously well fertilized for a number of years, additional fertilizers may be of comparatively little use, in producing a crop of the size indicated below. The use of just a little 0-9-27 in row is suggested by the figures of which these below are a

part. Alongside this plot, one acre in Valencia onions produced about 350 sacks bringing $2.50 per sack, or about $875.00 per acre.

No fertilizers, average of 2 checks	255 bu.
500 pounds 0-9-18 per acre	280 bu.
500 pounds 0-9-27 per acre	282 bu.

IV. **A Summary of the 500-lb. Applications on the Whole Ten Plots** indicates that fertilizers were needed and that 0-9-27 was the best analysis in 1931. The addition of 3% nitrogen lost 25 bu. of crop and raised the cost $10 per ton. The nitrogen in the 3-9-27 was nitrate of soda.

No fertilizer, average of 20 checks	177 bu.
500 pounds 0-9-0	196 bu.
500 pounds 0-9-18 per acre	280 bu.
500 pounds 0-9-27	258 bu.
500 pounds 0-9-36	236 bu.
500 pounds 3-9-27	233 bu.

The results show that 0-9-27 in 1931 was better than 0-8-32 which is the same as 0-9-36, being a ¼ ratio, but not as concentrated as 0-9-36.

V. **The Superiority in 1931 of 0-9-27 to All Other Analyses in Use** becomes still more apparent when we compare with no fertilizer and 500 pounds each of 0-9-0 and 0-20-0, and with the other figures given us. No. 4, the average at each place of the 0-9-27 and 0-9-36, at 500 pounds and at 1,000 pounds per acre. Not alone on the average but at every place the 0-9-27 was best, and 500 pounds better than 1,000 pounds per acre.

500 pounds 0-20-0 per acre	200 bu.
Average of all 500 lb. and 1,000 lb. applications of 0-9-27	270 bu.
Average of all 500 lb. and 1,000 lb. applications of 0-9-36	249 bu.

Commercial Cleaning of Potatoes for the Market

H. G. INGERSON, John Bean Mfg. Co., Lansing, Michigan

Better potato production methods have developed additional marketing problems. As potato production becomes more specialized with yields of high percentage of fancy stock, the grower immediately becomes interested in developing better markets for the part of the crop that is table stock. This trend is thoroughly shown in the rapid acceptance of the small consumer package by the leading growers in many sections. Without a doubt, more progress was made along this line in the marketing season of 1930 than in any other previous year.

The eastern growers are putting up this consumer package and immediately come in competition with western potatoes which have been washed previous to shipping. Regardless of eating quality, potatoes are sold to the consumer almost entirely on appearance. To meet this competition, an economical method of removing dirt and other foreign material becomes an absolute necessity. This problem was brought to our attention by various extension men in the potato work.

Potatoes may be washed satisfactorily but the drying process is difficult and expensive. Before proposing washing to the eastern growers, careful tests were made with different types of cleaners, such as are used for cleaning and polishing fruit. The first tests were with an all-cloth type polisher which had been very effective with apples and peaches. This did not give satisfactory results with potatoes and was soon passed by. Horse-hair brushes arranged to rotate at medium speeds have long been used for cleaning and polishing both citrus and deciduous fruits. Tests with this equipment showed real promise and a cleaner has now been developed that is very efficient in handling potatoes.

The essential parts of this cleaner are a series of horse-hair brushes 4½ inches in diameter and set transversely in a metal frame. These brushes are spiral and the spirals alternate on adjacent brushes. This spiraling serves to turn the potato in every conceivable position and this accounts for the cleaning of even deep-eye varieties. These brushes rotate all in one direction, in this way acting as a conveyor as well as the cleaning agency. The valleys between these brushes are sufficiently deep that the potatoes will remain in any valley until replaced by more potatoes from the receiving end. This feature allows different lots to be held in the cleaner different lengths of time, depending upon the nature of the soil and other factors.

To assist in this cleaning action, a series of cloth buffers is placed over the valleys formed between the brushes. These cloths are set so that slight pressure is exerted on the potatoes. These cloths rotate at high speed and effect a polishing action in addition to the cleaning. The cleaning brushes are arranged so that the potatoes in traveling from one brush to the next travel up a slight grade. This incline arrangement adds greatly to the cleaning efficiency.

One other essential part of the potato cleaner is an all-metal enclosure to receive the dust and a large exhaust fan to pull the dust away from the cleaner and deliver it outside the building. The entire outfit is regularly operated with 3 H. P. electric motor or 5 H. P. gasoline engine.

Present indications are that the cleaner will most regularly be used in connection with a potato grader receiving the No. 1 size stock from the grader, cleaning it and delivering it either to a sorting table or directly to the shipping packages.

As with other new developments, this cleaner is being put into service by the larger growers of better class of potatoes. As their product commands a premium price in the market, smaller growers producing quality stock will want this cleaning service. This will, no doubt, be rendered by the agency of custom operators who will render a service of grading and cleaning the same as the community thresherman and silo filling operators.

Cleaned potatoes must bring a slightly increased price over the same quality stock not cleaned and any user of this cleaning equipment should ask and receive this premium.

We see this cleaning process coming into quite general use starting with the consumer package and extending to a large part of table stock potatoes. The better price secured will justify better production methods and result in more profit to the better type of growers.

Potato Breeding Technique

F. J. STEVENSON and E. H. MILSTEAD
U. S. Department of Agriculture, Washington, D. C.

In preparing potato seed for planting the first task is to separate the seeds from the fruit or seed ball. If only a few balls are to be threshed the process is very simple, each fruit may be cut open and the pulp and seed squeezed out on a small rectangular piece of blotting paper. The jelly-like substance surrounding the seeds will adhere to the blotter and have the effect of gluing the seeds to its surface. These pieces of blotter can then be put in small envelopes and filed away until planting time.[1]

The number of seed balls in the 1930 lots of hybrid and selfed seed saved at Presque Isle in the Cooperative Potato Breeding Experiments varied from 1 to 846, with a total of about 3000. It is obvious that it would be an arduous task to separate the seed from these by squeezing them one at a time. In 1929 Clark and Lombard used an ordinary food grinder to mash the seed balls. The pulpy mass was collected in a vessel and a sufficient volume of water added to dilute it. By placing the vessel in a warm

[1]This method was suggested by Dr. F. A. Krantz of the University of Minnesota.

room sufficient fermentation was induced to separate the seed from the pulp, the former settling to the bottom of the vessel and the pulp rising to the surface of the water. By decanting off the pulp the seed could be collected on a cheesecloth and quickly dried. In 1930 a seprosieve food grinder was used instead of the ordinary worm food grinder. This is not the ordinary type of food chopper but is one that is used in preparing purees. It grinds the pulp into a very fine mass and separates it from the skins and coarser parts of the fruits. Examination showed that while a few seeds adhered to this coarse material in most instances there was not enough to justify the time spent in washing it. The finer pulp and seeds were caught in a pan.

The next step in the process was to separate the pulp from the seed. If an attempt is made to wash out immediately with cold water a gel is formed which is almost impervious to water and which can not readily be separated from the seed.

In an attempt to improve the method of separation several variations were tried. The seed and pulp were placed in 2-quart jars and enough water added to almost fill the jar. To hasten the fermentation process about 1-32 of a cake of yeast was added to each jar. In addition to the yeast a teaspoonful of sugar was added to one of the jars. If lukewarm water was added the pulp would rise to the top and separate from the seed in 8 hours. The sugar was found to be unnecessary so its use was discontinued. One lot of seed was washed as soon as ground with a 50 per cent solution of alcohol; in this case the gel did not form so that no difficulty was found in separating the seed from the pulp. The most satisfactory of these methods was to add tepid water and yeast and place in a warm room for a short period of time.

In 1931 still another method was employed. The pulp and seed were placed in a container, tepid water was added, and the contents were stirred vigorously. The heat prevented the gel from forming and as a result the seed was separated from the pulp immediately. The seed was then spread out on pieces of cheesecloth to dry after which it was placed in coin envelopes and filed away until planting time.

A germination test was made of the seeds treated by different methods. 200 seeds of each of six lots were planted on three different dates. In the fall of 1930, October 3, November 3, and December 12. The seeds of the six lots were treated in the following ways: (1) Washed immediately after grinding; (2) water, sugar and yeast were added and allowed to stand 24 hours; (3) water only was added and allowed to stand 32½ hours; (4) 50 per cent alcohol was added and washed after 1

hour; (5) water and yeast were added and washed after 24 hours. The sixth lot was taken from 1929 seed and sown as a check. The seed was sown in 6-inch pots in the greenhouse at Arlington Farm.

The 1930 seed planted October 3 started slowly and continued to sprout from October 9 to December 8, a period of two months, but the 1929 seed gave a total of 75.5 per cent germination within 15 days after planting. The total percentage of germination was somewhat less for the second planting than for the first, but the sprouting continued only one month instead of two. The 1929 seed sprouted in a much shorter time again than did the 1930. Of the plants of this lot 33 per cent appeared above the surface of the ground in 10 days. The highest percentage of germination was obtained from the planting made December 12 (Table 1). The seed of these lots germinated more quickly than did that of the other two plantings, but again the 1929 seed sprouted before the 1930 lots.

No very definite conclusions can be drawn from the small amount of material used and the data obtained, but certain tendencies are quite apparent. New potato seed takes longer to germinate than old seed; new seed varies in the length of the dormancy period. A few seeds of the 1930 lots planted on October 2 sprouted in from 7 to 10 days; the sprouting of other seed of the same lots did not take place until 60 days after planting; nearly all the 1929 seed germinated in from 7 to 15 days. Although there was marked variation in total percentages in the three plantings of the same lots, the third planting gave a higher percentage of germination for the four different treatments than did the lot which was washed off immediately. None of the 1930 lots, however, showed as high percentage of germination as did the 1929 seed, even in the third planting, as can be seen in Table 1.

TABLE 1—Percentage of Germination for the Lots of Potato Seed Treated in Several Ways and Planted at Three Different Dates

Greenhouse number	Method of treatment	Oct. 3 planting per cent	Nov. 3 planting per cent	Dec. 12 planting per cent
1	Washed immediately	33.0	35.5	39.5
2	Water, sugar and yeast 24 hrs.	41.5	15.0	67.5
3	Water, tap 32½ hrs.	32.0	18.5	47.0
4	Alcohol 50 per cent 1 hr.	15.5	20.0	60.0
5	Water + yeast 24 hrs	55.5	29.5	57.1
6	1929 seed	75.5	46.5	81.0

Tuber Production from Seed in the Greenhouse

A number of the plants from the germination test were potted and an attempt was made to produce tubers from those grown to maturity in the greenhouse. One group of plants was grown in 2-inch pots only; another group was grown in 2-inch pots and transferred to 4-inch pots; another was grown in 2-inch 4-inch and finally 5-inch pots; another in 2-inch, 4-inch and 6-inch pots.

As shown in Table 2 the best tubers were obtained from the plants grown first in 2-inch and later transferred to 4-inch pots. Fairly large tubers were obtained from 25 of the plants grown in 2-inch pots, but 40 other plants were discarded because the tubers were considered too small to save. The plants grown first in 2-inch pots, transferred to 4-inch pots, and later to 5-inch, gave a larger number of tubers per plant but the tubers averaged smaller in size than those in the 4-inch pots. They apparently received a setback when they were transferred from 4-inch to 5-inch pots, and while they set more tubers, the tubers did not attain the size of those left in the 4-inch pots. The tubers of the plants grown first in 2-inch pots, transferred to 4-inch and later to 6-inch pots were not weighed but it could be seen that about the same results were obtained with this group as was found with those grown in 2-inch, 4-inch and 5-inch pots. The most satisfactory results then were obtained from the early planting pricked out in 2-inch pots and later transferred to the 4-inch pots. It is possible that the best method would be to transfer the plants directly from the seed pans to 3½- or 4-inch pots and permit them to mature there.

TABLE 2—Tubers Grown by Different Methods in Greenhouse at Arlington Farm, 1930-31

Size of[1] pots used	Date planted	Total plants	Plants saved	No. tubers from 25 plants	Av. wt. of tubers grams
2″	Dec. 12	69	29	57	2.6
2″ transferred to 4″	Oct. 2	94	81	76	3.1
2″ transfered to 4″, to 5″	Oct. 2	135	126	90	1.7

[1]The seed for each of these lots was from the 1930 cross S.43322 x S.42667.

Treatments to Break the Rest Period

Tubers from 21 of the plants grown from seed in the greenhouse were treated by two different methods to break the rest

period. Part of the tubers from each plant, a total of 45, were treated with ethylene chlorhydrin 6 per cent dipping and gassing treatment for 24 hours; the remainder, a total of 42, with sodium thiocyanate 1½ per cent soaking treatment for 1 hour. Twenty-two tubers were planted without treatment as a check. These tubers were planted February 9, three days after they were harvested. The total percentage of tubers sprouting was very small, as can be seen in Table 3, but this was probably due to the condition and size of the tubers rather than the treatments, since the checks which were planted without treatment did not give a higher percentage of germination than did those treated with sodium thiocyanate. It can not be determined from these data whether the treatments had any effect on shortening the rest period since the checks sprouted in about the same time as did those that were treated. The seed that produced these plants was the result of crossing two unnamed U. S. D. A. seedlings, S.43752 and S.43711. It is quite possible that there was a segregation for length of rest period.

The tubers from 203 plants of the cross S.43322 x S.42667 were harvested March 30, placed in cloth bags and left in the laboratory at room temperature for about a month. They were then shipped to Presque Isle, Me., and planted in the field on May 20. All the tubers from a single plant ranging in number from 1 to 6, were planted in a single hill. Of the 203 hills planted, 200 produced plants with a growth similar to other plants of a like nature started from tubers grown in the field.

Table 3—Data on Sprouting as the Result of Chemical Treatments to Break the Dormancy of Potato Tubers

	Total planted	Number sprouted				Total sprouted
Treatment		3-23	3-27	4-6	4-15	
Ethylene chlorhydrin	45	3	1	1	1	6
Sodium thiocyanate	42	4	3	7	-	14
Check	22	2	1	1	3	7

Conclusions

The most satisfactory way of extracting seed from potato seed balls is to grind them in a seproseive food grinder which separates the coarse parts of the fruit from the pulp. Add tepid water to the pulp and stir vigorously. The pulp will separate

from the seed immediately. The seed can then be spread out to dry.

In this experiment new potato seed took longer to germinate than seed 1 year old and did not have as high total percentage of germination.

Tubers large enough to produce good plants in the field were obtained by planting the seed early in the fall and growing the plants to maturity in pots in the greenhouse.

Further tests of chemical treatments to break the rest period of small tubers grown in pots in the greenhouse will have to be made before definite conclusions can be drawn.

Tubers left at room temperature for six weeks before planting produced normal, vigorous plants in the field at Presque Isle, Me.

Yellow Dwarf in New York State

K. H. FERNOW and L. M. BLACK, Cornell University, Ithaca, N. Y.

This disease has been known in New York since 1917 but it is doubtful whether the potato inspectors were all capable of correct diagnosis before 1920. At that time the disease was prevalent in table stock fields in the neighborhood of the Adirondacks and the Hudson River Valley. Occasional cases occurred in other parts of the state. Since 1920 the amount of yellow dwarf in these areas has decreased and it is now not very important in the districts where it formerly prevailed.

Yellow dwarf was never an important factor in fields under inspection for seed purposes before 1929. Beginning in 1929 there has been a steady increase in the amount of yellow dwarf in both seed and table stock. The increase has been largely confined to an area including portions of Steuben, Yates, Livingston, and Allegany counties, although slight increases have been noted in other parts of western New York and elsewhere where seed from this area has been introduced. Observations made in this area have convinced the senior author that the disease has been present here for a long time. Samples of certified seed collected from the fields of the state and planted at Ithaca, each consisting of 100 tubers, showed yellow dwarf in 1929 in 3 per cent of the samples, in 1930 in 9 per cent of the samples and in 1931 in 22 per cent of the samples. The largest amount shown by any sample was 13%. The outbreak appears to be somewhat correlated with high temperatures and dry weather, conditions which were especially prevalent in the affected district in 1930 and 1931.

Yellow dwarf has been found more abundantly in Green Mountains than in Rurals even when the two varieties have been grown together for several years. However all varieties commonly grown appear to be subject to infection.

The junior author has recently succeeded in transmitting the disease in the field and obtaining vine symptoms by stem-grafting. Although tubers from noticeably affected plants are almost invariably so badly affected as to insure their being discarded for planting, the disease is nevertheless carried in the planting stock in large tubers. These tubers probably come from plants affected too late in the season to show symtoms on the vines. In one lot of 10 ounce tubers which appeared healthy to external view, 20 per cent of the tubers showed internal brown flecks characteristic of the disease. In some cases the flecking was very slight and some cases were doubtless overlooked.

Outside of New York the disease is known to occur in Vermont, Pennsylvania, Minnesota, and Michigan, and has also been observed in Florida and New Jersey in seed obtained from these states. It will probably be found to be present in all the states which are warm enough to bring out the symptoms. Whether it will be found in the cooler states of the Northeast is doubtful.

Crop and Market News

Potato Markets Weak

(Contribution from the Bureau of Agricultural Economics)

Although supplies of new potatoes have been much lighter than last year, markets have been weak and prices relatively low. By June 11, only 14,000 cars of new stock had been shipped, compared with 31,000 to the same time last season. Weekly movement of some 3,200 cars was scarcely half that of a year ago. City prices had declined continuously and by mid-June were slightly below the level of last season. F.o.b. values were then about one-fourth lower than in 1931.

The active shipping season in South Carolina was closing and most of the Gulf States had finished moving their early potato crops. North Carolina shipments were at their peak in mid-June, with Virginia, Oklahoma and Arkansas also becoming active.

Commercial production of potatoes in the six second-early States, on the basis of conditions reported June 1, was forecast at 13,719,000 bushels, or about one-fourth less than the 18,651,000 bushels estimated produced commercially in these States

last year. With prospective yields averaging about the same as last year for this group, the reduced crop expectation is primarily due to the cut made in acreage.

In the five intermediate States, acreage apparently has been reduced only slightly and, with yields expected to average about 11% larger than last year, the June 1 forecast of commercial production in this group of States was reported at 11,010,000 bushels, compared with 10,140,000 last year.

The crop forecast, segregated by States, is given below:

Estimated Commercial Production for Two Years

Second-Early States	1931	1932
	(1,000 bus.)	
Arkansas	552	434
Maryland	1,170	1,008
North Carolina	5,192	3,375
Oklahoma	999	968
Tennessee	99	128
Virginia	10,639	7,806
Total	18,651	13,719

Intermediate States	1931	1932
	(1,000 bus.)	
Kansas	2,138	2,482
Kentucky	468	740
Missouri	718	878
Nebraska	416	400
New Jersey	6,400	6,510
Total	10,140	11,010

Brief notes for some of the important producing States were published as follows during June:

Texas: Movement in the Sugarland-Wharton-Eagle Lake area began the third week in May, was at its peak on June 1 and should be in the decline by June 10. Harvesting in Bexar County started June 1; crop is in good condition with excellent yields expected, but the local market probably will absorb most of the production. Harvesting in miscellaneous counties, mostly in north Texas, will be under way early in June, but movement from the state will become light after June 15.

Virginia The condition of early potatoes on the Eastern shore declined considerably during the latter part of May and the first week of June, as there was no rain during this critical period. In past seasons, when rainfall was light during this period, yields have been very low. Growers are very much worried over the prospect, and state that the yield will be further reduced if there are no rains at an early date.

Last f.o. b. report of the season in southern Alabama showed a range of 85c-90c per 100-pound sack of Bliss Triumphs. Louisiana shipping-point prices had strengthened slightly to 90c-$1 by June 15, but the Texas f. o. b. market was weak at 75c-90c per

sack. Eastern Oklahoma points reported an opening range of 90c-$1. Long Whites in the Shafter district of California were returning the growers only 50c-60c per 100 pounds. When peak movement of Cobblers had passed in North Carolina, shippers quoted slightly higher prices at $2.25-$2.50 per barrel or $1.25 per 100-pound sack.

City values of new potatoes strengthened about mid-June to a general jobbing range of $2.50-$3.50 per barrel of best eastern Cobblers, and southern Triumphs were selling mostly at $1.25-$1.75 per sack.

Shipments of old potatoes from storage had decreased to about 250 cars per day, but were seven times heavier than a year ago. Maine was still forwarding 150 cars daily, even though the f. o. b. price of sacked Green Mountains had dropped to 25c per 100 pounds, or half the price of the month before. Movement from North Central States was averaging 60 cars per day, and Idaho during mid-June still forwarded 35 cars each day. Green Mountains from Northern Maine were jobbing in large eastern cities at 65c-$1.25. Carlot sales in Chicago were maintained at a rather steady level, with northern Round Whites ranging 70c-85c and Idaho Russet Burbanks $1.25-$1.35 per 100 pounds.

UNITED STATE POTATO ACREAGE ABOUT 1% ABOVE LAST YEAR

The July 1 estimate of 1932 plantings of potatoes total 3,411,000 acres for the United States, an increase of 1.2% over the 1931 acreage harvested. Decreases in some important states were more than offset by increases in other states. The largest increases in potato acreage were reported for the central states where farmers decided to utilize a large part of their plentiful seed stock. Increases in potato acreage in some of the important states were as follows: Pennsylvania 3%, Ohio 9%, Minnesota 3%, Michigan 6%, North Dakota 40%, Nebraska 7% and Colorado 15%. There was no change in the potato acreage in New York State and the following states reduced potato accreage—Maine 11%, Wisconsin 5%, Virginia 20% and Idaho 10%.

Present indications point to a United States potato crop totalling 377,769,000 bushels compared with 375,518,00 bushels the revised estimate of 1931 production and 361,115,000 bushels the five year average 1924-28. This prospective crop is approximately equal to the crop harvested last year and nearly 5% above the five year average. The outlook for potato yields at present is approximately equal to that of a year ago for the country as a whole.

In New England a total of 228,000 acres of potatoes have been planted for the 1932 crop compared with 249,000 acres harvested last year. Changes in potato acreage in the New England States range from a decrease of 11% in Maine to an increase of 10% in New Hampshire. The present outlook is for a crop totalling 55,060,000 bushels compared with 58,840,000 bushels harvested in 1931 and 44,515,000 bushels the five year average 1924-28. Weather conditions to date have been favorable and yields are expected to average higher than in 1931. In Aroostook County the crop was planted under favorable weather conditions and has made a slow but satisfactory growth to date. Although less fertilizer than usual was used in planting the compartively dry season will enable the crop to get the maximum benefit from available fertilizer. Expected production in Maine at 46,980,000 bushels is about 8% less than the crop harvested in 1931, but nearly 25% greater than the average crop during the five years 1924-28.

The eight major late crop states (Maine, New York, Penn., Mich., Wisc., Minn., N. D., and S. D.) have increased their potato acreage 3.5% and have an indicated production about 1% less than harvested in 1931. The eighteen late surplus states (including the eight above and Neb., Mont., Idaho, Wyoming, Colorado, Utah, Nevada, Wash., Oregon, and California) planted over 3% more potato acreage and expect a crop 4% larger than harvested last year. In the twelve minor late potato states which include New England outside of Maine and Ohio Valley States potato acreage has been increased by 6% and production is expected to show a corresponding increase over that of last year.

The eleven southern early states (N. C., S. C., Ga., Fla., Tenn., Ala., Miss., Ark., La., Okla., and Texas) have reduced potato acreage by 11%. Estimated production in these states is 26% less than harvested last year. The seven intermediate states N. J., Del., Md., Va., Ky., Mo., and Kansas) whose crop is now being marketed have reduced potato acreage slightly over 1%, but are harvesting a crop practically equal to that of last year.

—New England Crop Reporting Service

C. D. STEVENS
Statistician

NOTES

NEW YORK

Prospects for 1932 in New York as of July 1 appear to indicate about a normal crop. There probably has been a slight reduction in acreage planted and some reduction in fertilizer application. There has been very little reduction in the number of applications for certified seed inspection. The planting season continued over a wider period than usual, some sections not finishing until late June.

The Long Island fields in both Nassau and Suffolk Counties were in excellent condition at the time of the annual tour on June 22 and 23. The general rains which occurred about June 15 to 20 have greatly improved both the Long Island and the New Jersey prospects. Local areas in western New York have suffered from drought but much of the crop was too late planted to be seriously injured.

The annual Long Island potato tour on June 22 and 23 was better attended than usual, representatives being present from Maine, Massachusetts, Connecticut, Vermont, New Jersey, Pennsylvania, Virginia and New York. Growers from Aroostook County, Maine, agreed that the acreage in Maine this year has been reduced about 15 per cent and the fertilizer application about 20 per cent under that of 1931. The only state or section reporting unfavorable crop prospects was the Eastern Shore of Virginia where both the decreased acreage and the severe drought have combined to reduce crop prospects to not over two-thirds that of last year.

Plans are now well under way for the annual potato field day of the Empire State Potato Club. The meeting will be held on August 12 at the farm of Seymour Bridge at Arkport in Steuben County. Last year over 5000 growers attended the annual field day at Hubbardsville. The program will be equally attractive this year. Potato machinery of all kinds will be demonstrated throughout the day. Special features this year will include a plowing contest among local growers and a pageant demonstrating the evolution of harvesting methods.

—E. V. HARDENBURG

Review of Recent Literature

Yeager, A. F. Growing Potatoes in North Dakota. North Dakota Extension Circ. 110. March 1932.

This is a 4 page popular discussion of recommended potato growing practices in North Dakota. Importance of the potato as a cash crop is pointed out. The author recommends that this crop is a valuable addition to the rotation, that wheat yields better after potatoes than after wheat and just as good after potatoes as after summer fallow. He recommends disking in the fall, then shallow plowing followed by disking and deeper plowing in the spring. The three standard varieties are Cobbler, Triumph and Ohio. Treating all seed with either hot formaldehyde or corrosive sublimate is recommended. Planting 1½ ounce seed pieces, 4 inches deep, between May 15 and June 1 is advocated. Considerable discussion is given to care in digging to reduce tuber injury. The author suggests storing the new crop at 50°F until all wounds have been healed after which 40° should be maintained throughout the remainder of the storage period.

—E. V. HARDENBURG

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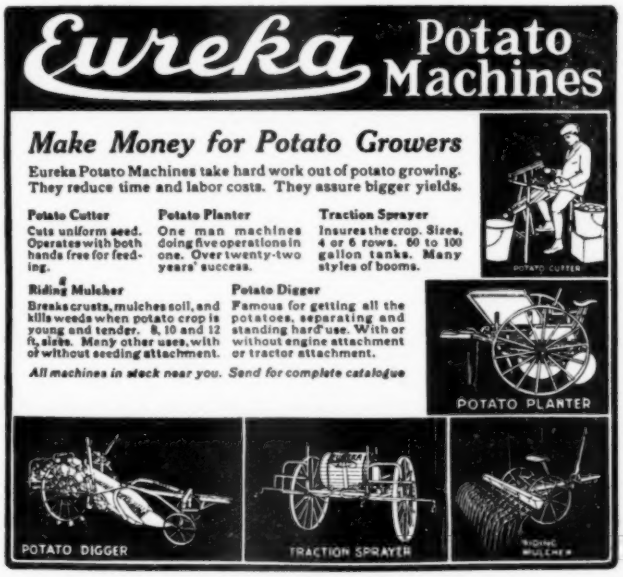
HAMMOND INDIANA

Folsom, Donald, Owen, F. V., and **Smith, Hugh B.** Comparisons of Apparently Healthy Strains and Tuber Lines of Potatoes.

The authors report results of an attempt to find evidence of real differences existing between apparently healthy strains of potatoes of different varieties. The work began in 1923 after which date there was much evidence that most of these differences were due to the presence of seed-borne diseases. The authors also hoped to determine the relative effect of heredity, environment, and diseases in causing strain differences. Most of the studies were made under favorable conditions at Aroostook Farm, Presque Isle, Maine. Characters used in these studies were mainly yield and tuber type. Healthy strains of Green Mountain, Cobbler, and Triumph were compared over a period of five years.

The general practical conclusions drawn are as follows: (a) Commercial strains of the same variety may differ in the same set of conditions due to inherent differences in nature with respect to yielding power, tuber weight, and tuber shape. However, if they do differ thus, the fact is very difficult to demonstrate. Also such differences are too small to be worth spending effort upon them. (b) This applies also to tuber-line or hill-line selections.

—E. V. HARDENBURG.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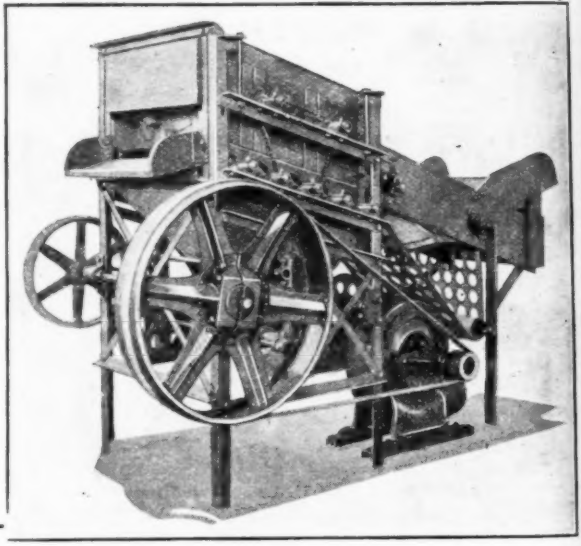

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